

REMARKS/ARGUMENTS

Reconsideration and withdrawal of the outstanding grounds of rejection is respectfully requested.

Claims 1-14 and 16-20 remain pending in this application. Claim 1, the sole independent claim, and dependent claim 14 have been amended, and claims 15 and 21 have been canceled.

112 Rejection

Claim 14 has been rejected under 35 U.S.C. §112, first paragraph, for allegedly failing to comply with the enablement requirement. (See 2 of the Office Action).

In rejecting claim 14, the Examiner states that the invention is only enabled for a rotating tool and contends that the claimed invention is a blade tool. The Examiner has apparently misinterpreted the meaning of “blade” and consequently of claim 14. This interpretation is of a tool being a blade e.g., for planing (as is distinguished in the section regarding the prior art rejections). Such is not the case, however. First, claim 1 as amended clarifies the nature of the tool (both first and second) as being a “rotating” tool. Second, the language of claim 14 does not state that the first tool is a blade, but rather, that the first tool comprises a blade- which, as the Examiner knows, means “includes” a blade. “Blade” in the context of a rotating tool for, e.g., milling, would be understood by one of ordinary skill in the art as being cutting blades on a rotating cutter head, as is clearly shown in e.g., Figs. 3 and 4. Note also the reference to the blade of the tool in the final two lines of page 6 of the specification as filed. Thus, claim 14, properly interpreted, recites a case where the first rotating tool includes a blade, and the diameter of the first rotating tool is selected according to a radius of connection at the base of the blade.

Prior Art Rejections

Claims 1-3, 14 and 16-17 have been rejected under 35 U.S.C. §102(b) as being anticipated by EP 0 992 310 A2 to Lowe. Claims 1-5, 7-10, 15-17 and 20 have been rejected under 35 U.S.C. §102(b) as being anticipated by USP 5, 438,755 to Giberson.

Independent Claim 1

In regard to claim 1, the Examiner has taken the position that Lowe discloses all the elements recited in these claims. (See Office Action, 6, pp. 3-4.)

Specifically, the examiner takes the position that:

...Lowe discloses a method for production of a rotor (16) of a centrifugal compressor (see col. 1, line 13), produced from [sic] a monolithic disc (10), and that the disc is worked in a radial direction by at least one tool (22) of a numerical control machine (20, see [0025] (“digitally programmable controller of the machine”)), to remove shavings to produce radial cavities (30) in the rotor. (See page 3, 4 of the Office Action)

Applicants respectfully do not agree with the Examiner with regard to the teachings attributed to Lowe. Applicants respectfully submit that the teachings of Lowe are not and cannot be as stated by the Examiner in rejecting claim 1 for at least the following reasons.

Lowe is clearly directed to a more standard milling process used in the formation of bladed disks (or “blisks”). In the milling process described by Lowe, the individual blades are formed by milling the periphery of the blade shape from the integral disk. After an initial groove is cut (see e.g., col. 3, lines 24-26) the blade sidewalls are then cut, forming a so-called “pocket” between blades. The “pocket” of Lowe however, has only 2 defined sides: those of the blades that define the pocket. The other 2 sides of the “pocket” are non-existent.

The milling process of the present invention, on the other hand, is to form cavities in the integral block disk to form an impeller (rotor) for a centrifugal compressor. Accordingly, the Lowe process does not including “working said disc in a first radial direction by at least one rotating tool of a numerical control machine, such as to remove shavings and to thereby produce partial finally contoured radial cavities encapsulated within the outer surfaces of said rotor; and working each disc in a second radial direction, substantially opposite to said first radial direction, by at least one other rotating tool of a numerical control machine such as to remove shavings and thereby produce complete, finally contoured radial cavities” as claimed. Thus, there can be no anticipation of claim 1 by Lowe.

Turning to Giberson, Giberson teaches a process for forming a shrouded impeller from a single blank which involves four to six steps.

First, a rough, solid one-piece blank is turned and bored to an impeller profile that is somewhat oversize with respect to the finished impeller. Next, using a three dimensional CNC milling machine with end mills, as much material as possible is removed from what are to be the ends of passageways in the impeller, to define leading and trailing edge zones of the impeller passageways. The material in those passageways is, in this step, removed in direct line of sight from the outside diameter and from an eye of the impeller blank. Next, a hole is formed through a central zone of each impeller passageway area, roughly to define the passageway. Then, the remainder of the material in the passageways is removed by three dimensional planing controlled by the CNC machine, preferably leaving a few thousandths of excess material for a finishing step. Thus, in Giberson, a rotating tool is used to roughly define the passageways and a non-rotating three dimensional planing tool is used for the finishing step.

An important advantage afforded by the present invention that is simply not taught or suggested by Giberson is that a rotating CRC machine tool is used for the entire process. No planing occurs. Thus Giberson does not teach at least the claimed process of

working said disc in a first radial direction by at least one rotating tool of a numerical control machine, such as to remove shavings and to thereby produce partial finally contoured radial cavities encapsulated within the outer surfaces of said rotor ; and

working each disc in a second radial direction, substantially opposite to said first radial direction, by at least one other rotating tool of a numerical control machine such as to remove shavings and thereby produce complete , finally contoured radial cavities.

Accordingly, neither Lowe nor Giberson can fairly be said to teach or suggest the claimed process for forming an impeller/rotor for a centrifugal compressor. Furthermore, the functionality of the present invention is also different from that of the cited art in at least the foregoing respects. Accordingly the present invention as recited in claim 1 is neither anticipated by nor rendered obvious in view of the limited and different teachings of each of Lowe and Giberson.

Dependent Claims

Applicants have not independently addressed the rejections of the dependent claims because Applicants believe that independent claim 1 from which the dependent claims depend is allowable for at least those reasons discussed supra, the dependent claims are allowable for at least similar reasons.

The amendment was made to claim 1 in light of applicant's gaining a better understanding of the Examiner's position with respect to the cited prior art. As such, and

because the amendment places the application in condition for allowance, entry of the Amendment is fully consistent with 37 C.F.R. § 1.116(b).

In view of the foregoing, Applicants believe that claims 1-14 and 16-20 as presented herein are allowable over the prior art of record, taken alone or in combination, and respectfully request that the respective rejections be withdrawn and the application allowed. In the event, however, any small matters remain outstanding, the Examiner is encouraged to telephone the undersigned so that the prosecution of this application can be expeditiously concluded.

Respectfully submitted,

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